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Bundesministerium für Bildung und Forschung

GRoW
GLOBALE RESSOURCE WASSER

THE CASE STUDIES TAKE PLACE IN FOUR CATCHMENT AREAS:

Upper and Middle Weser (Germany) This case study analyses water use and distribution along the Weser river and identifies possible impacts on water resources. It sets out in particular to evaluate the direct influences of the thermal power plants on water quantity, water quality and aquatic biodiversity.

Upper Danube (Germany) Optimization routines are developed for the energetic production of hydropower plants, under consideration of further usage interests in the region. In order to provide information on the tension between the energy and water system, the research determines the energetic and hydraulic potential of the hydropower plants as well as their environmental impacts.

Rio dos Patos (Brazil) The impacts of energy production from sugarcane bagasse on both water quantity and quality are analyzed in the basin of the Rio dos Patos along with potential environmental impacts and opportunities to enhance water use efficiency on site. For the water footprint calculation additionally the off-site water use for e.g. fertilizer production or for the material needed for the sugar mill construction will be considered.

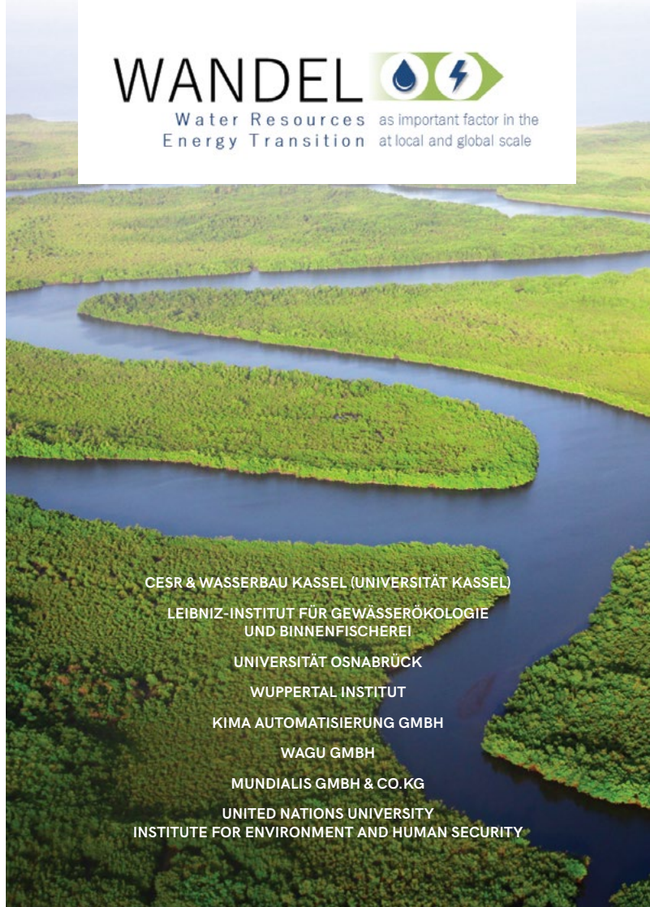
Drâa-Valley (Morocco) Critical scenarios for long-term water supply and demand are identified considering the expansion of concentrating solar power plants (CSP) and different socio-economic development pathways. Based on these scenarios, the study will develop socio-economic and energy-saving measures for water usage for the region, and solutions for the implementation of these measures will be proposed.

By calculating water footprints, the four case studies contribute to the identification of potential global hot spots of water demand. This enables the determination of remote effects along the process chains of renewable energy systems as well as regions where limited water availability may restrict the development of water-intensive, renewable alternatives.

Pinpointing conflicting goals and synergies between the Sustainable Development Goals of water and energy provides important insights which may define the location and type of future energy systems or additional mitigation measures, making the achievement of both sustainability goals possible.

WANDEL

Water Resources Energy Transition as important factor in the at local and global scale



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The 2030 Agenda and its 17 Sustainable Development Goals (SDGs) pave the way for a sustainable development. SDG 7, the access to affordable, reliable, sustainable and modern energy, represents an especially important goal, closely linked to the German Energiewende (energy transition).

In order to achieve this goal, limiting factors, such as the availability of water resources, must be considered. According to SDG 6, the availability and sustainable management of water and sanitation must be ensured for all. Potential limits on water resources, which could influence the energy transition, thus need to be examined.

The WANDEL project aims to identify such conflicts and synergies in order to develop practical solutions and support their achievement.

The joint project WANDEL is funded by the Federal Ministry of Education and Research (BMBF) as part of the programme "GRoW – Global Resource Water" within the framework of the "Research for Sustainable Development (FONA)" programme.

WANDEL ADDRESSES TWO KEY RESEARCH ISSUES:

- Will restrictions on water availability limit the use of conventional energy systems, thereby accelerating the energy transition?
- Can restrictions on water availability delay or even hinder the implementation of a global energy transition?

WANDEL SHOWS PRACTICAL RELEVANCE

Four case studies are carried out with regional actors, in order to:

- Determine direct influences and remote effects of conventional and renewable energy systems. Future conditions will be examined until the year 2030 (with an outlook to 2050).
- Define competition between water and energy usage in the context of the energy transition. Potential tension between water requirements of energy systems and water availability will identify dependencies of competing water uses as well as possible conflicts and synergies between the SDGs.
- Develop practice-oriented solutions to increase the integrated water-use efficiency, by providing concrete technical solutions and governance structures to improve the water management.